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## *Observations of the Leonid Meteors*, 1896, *at the Oxford University Observatory.*

(*Communicated by H. H. Turner, M.A., B.Sc., Director.*)

On November 13 the night was thickly overcast with fog, and no meteors were seen.

On November 14 a watch was kept by Mr. F. A. Bellamy and Mr. F. C. H. Carpenter from $9^h$ till $16^h$.

Mr. Carpenter commenced to watch at $11^h\ 15^m$ for any meteors that might appear about the constellation *Leo*, with instructions to note the number counted every quarter of an hour, and to locate any specially bright ones. None were seen from $11^h\ 15^m$ to $12^h$, individual meteors were seen at $12^h\ 4^m$, $13^h\ 7^m$, $13^h\ 13^m$, and $13^h\ 58^m$; at $14^h\ 15^m$ the sky became overcast and remained so till $15^h\ 30^m$. Cloud was frequent throughout the period of watch.

Preparations were made by Mr. F. A. Bellamy to photograph the radiant point. Two cameras were fixed to the telescope in the De la Rue dome, and one to the Astrographic telescope; a plate was also exposed in the latter telescope; both telescopes were pointed at R.A. $10^h$ and Dec. + 20°. No meteor tracks were found on the plates.

Cloudy weather with drizzling rain prevented any attempt being made to photograph the *Andromedes* on November 27.

## *The Aurora of* 1896 *March* 4. By T. W. Backhouse.

The aurora of March 4 was observed here, though not by myself before $10^h\ 57^m$. A ray, probably the same as that noted by Mr. Goatcher at Cambridge, was seen by my secretary as a conspicuous feature, being at $8^h\ 27^m$ G.M.T. almost vertically under the *Pleiades*, pointing to those stars, and reaching, bright, to half, thence gradually fainter to five-sixths their altitude; it had moved slightly and slowly southwards during the previous five minutes. There is uncertainty as to whether this feature was sufficiently inclined to the vertical as seen here to be a true and perfect auroral ray; while at Cambridge the inclination was too great. It is not professed that the inclination is accurately given at either place; but unless there is considerable error in the descriptions it would appear that the phenomenon was a bundle of rays rather than a single one, and that the lower portion was further east than the upper. It is clear that a true auroral ray was seen later in the evening by other observers, according to

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the records in the *Monthly Notices* of March last. Anyone who is familiar with the ordinary type of aurora with streamers cannot fail to recognise in most of the accounts contained in that number of the *Notices*, and the drawing by Sir W. J. Herschel on p. 334, a very good description of an auroral display. No doubt Sir W. J. Herschel and others saw the zodiacal light as well, and it was merely a coincidence that the two phenomena were superposed.

Observations of the ray seen here were made at several other places, and one made at York by Mr. J. E. Clark was sufficiently exact for him to use in conjunction with those at Sunderland and Cambridge to calculate the height. He finds that at 8.30 P.M. it was 200 miles above Galway Bay at the top, and 40 miles or less at its base, above a point a quarter of the distance from Louth to Drogheda. With these positions it could not be a simple ray ; but if we assume that it was one, and that there was error in the descriptions, and take the mean position, it would still leave the middle of the ray at an altitude of about 120 miles, while the height of the apex would be lowered, and that of the base increased.

## *Observations of Minor Planets at Windsor, New South Wales.*

By John Tebbutt.

The accompanying observations of minor planets during 1896 were made with the filar micrometer on the 8-inch equatorial and in an illuminated field. The differential observations are corrected for refraction, and a small error in the perpendicularity of the micrometer threads. The distance threads of the micrometer are so fine and the planet *Undina* was so faint that considerable difficulty was experienced in this case. On comparing the resulting places of *Calliope* with an approximate ephemeris kindly furnished by Dr. Bauschinger, of Berlin, I found there was a fair agreement except in the case of September 21, 22, 23, when the places depend on star No. 1. The only authority I could find for this star was Arg.-Oeltzen, in which catalogue it is given as No. 300. I was led to suspect that the tabular N.P.D. of this star was about a minute too great, and I accordingly made six comparisons of the star with the clock star $\beta$ *Ceti* on October 16, the result of which completely confirmed my suspicions. I have therefore adopted the mean place as derived from the equatorial comparisons. *Sappho* was brighter than I expected to find it. The opposition magnitude given in the *Berliner Astronomisches Jahrbuch* for 1898 is 9·3, whereas I regarded it as fully equal to 8·5. I will add that the quantities $p\Delta$ have been computed with an assumed value of the solar parallax $=8''{\cdot}85$.

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